

Weathermaster III Heat Pump

(Outdoor Fan Coil Section; Indoor Compressor Section)

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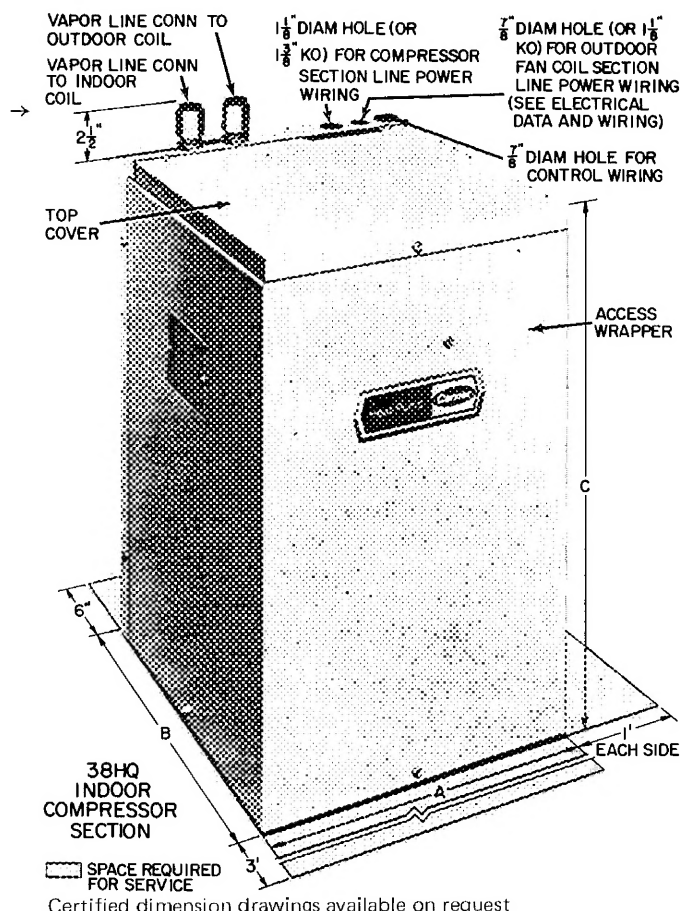
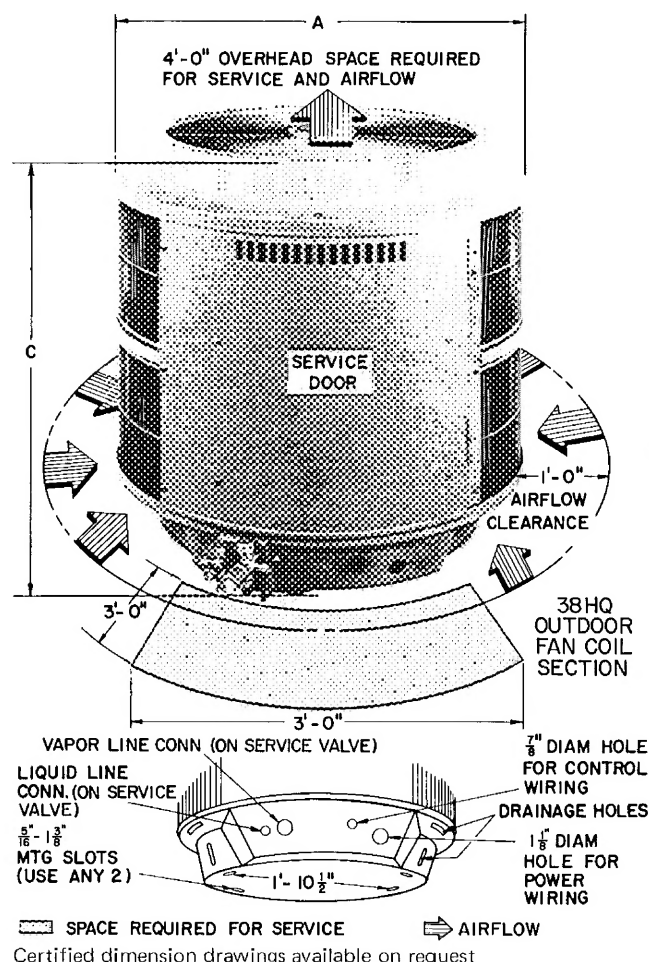


Table 1 — Installation Data
(Outdoor Fan Coil Section, Fig. 1)

UNIT		38HQ940	38HQ960
OPER WT (lb)		107	125
DIMEN. (ft.-in.)	Diam A	2-5¼	2-5¼
	Height C	2-8	3-8
REFRIG CONN. (in.)		Compatible Fitting (Vapor) and Flare (Liquid)	
Vapor* (ODF)		¾	
Liquid* (ODF)		¾	

*Recommended field-supplied refrigerant line sizes shown under Table 2

Table 2 — Installation Data
(Indoor Compressor Section, Fig. 2)

UNIT		38HQ127	38HQ134	38HQ140	38HQ146
OPER WT (lb)		111	117	141	142
DIMEN. (ft.-in.)	Length A	1-2¾			
	Width B	1-4¾			
	Height C	1-11½ (Add 2½ in. for Refrig Fittings)			
	CONN. (in. ODF)	Compatible Fittings (2)			
Vapor Lines (2)*		¾			

*Recommended refrigerant line sizes

INDOOR COMPR SECTION		38HQ127	38HQ134	38HQ140	38HQ146†
OUTDOOR FAN COIL SECTION		38HQ940	38HQ940	38HQ960	38HQ960†
VAPOR (in. OD)		3/4	3/4	7/8	1-1/8
LIQUID (in. OD)		3/8			

†The 38HQ146/38HQ960 system may use 7/8-in accessory tubing package with slight capacity loss, see page 3 Unit 38HQ146 factory supplied with four 3/4- x 1-1/8 in connection adapters (field installed) for field-supplied 1-1/8 in. system vapor line

NOTE: See Step 4 for maximum allowable length of interconnecting tubing

INSTALLATION

Step 1 — Check Equipment and Jobsite

UNPACKAGE UNITS — Move units to final location. Slide units from cartons taking special care not to damage service valves, compatible fittings or grilles.

INSPECT EQUIPMENT — File claim with shipping company if shipment is damaged or incomplete.

COMPLETE OR CONSIDER SYSTEM REQUIREMENTS before installing the 38HQ units.

Consult local building codes and National Electrical Code (NEC) for special installation requirements.

When installing units, allow sufficient space for airflow clearance (outdoor unit), wiring, refrigerant piping and servicing unit. Position outdoor unit so water or ice from roof cannot drop directly on top of unit. *Maximum allowable vertical distance between indoor and outdoor sections is 50 feet. It is strongly recommended that 38HQ units be used with Carrier approved indoor sections, see Table 3.*

Outdoor Fan Coil Unit — Make provisions for condensate drainage and defrost water disposal whether unit is installed on ground, roof or off-the-wall platform. (Ensure unit base pan drainage holes are not blocked.) See Mounting Outdoor Fan Coil Unit for details. Roof installation method for 38HQ depends on building construction and special requirements of local codes. Make sure roof can support unit weight.

Indoor Compressor Section — Locate unit in basement, garage or utility room. Indoor locations within the living space are not recommended. Basement installations also require careful planning to avoid areas directly under bedrooms, living rooms, etc.

Insert felt isolation pad (factory supplied) between unit and a rigid mounting base to absorb vibration. Isolate interconnecting tubing from framing and ductwork or where tubing runs thru stud spaces, enclosed ceilings or pipe chases. Use isolation type hanger, Fig. 3, since rigid fastening will transmit pulsation to structure creating objectionable sound.

System Refrigerant Control on 38HQ units and matching Carrier indoor fan coil units is a factory-installed AccuRater™ device (bypass type). Bypass-type AccuRater components are shown in Fig. 18. The AccuRater piston has a refrigerant metering hole thru it, and is field replaceable. Table 3 indicates indoor units that require piston replacement when used with specified 38HQ units. Replace piston as described under AccuRater Servicing on page 13.

Step 2 — Mount Outdoor Fan Coil Unit

ON THE GROUND: MOUNT OUTDOOR FAN COIL UNIT ON A SOLID, LEVEL CONCRETE PAD. See Fig. 4 for pad dimensions. Position unit so that coil drainage holes in base pan overhang the pad. (See Fig. 1 for drainage hole location.) See that pad does not obstruct drainage holes (holes drain water during heating and defrost cycles). Attach unit to pad with 1/4-in. mounting bolts. Position tie-down bolts in pad. Any 2 holes in unit base pan may be used to fasten unit to pad.

Table 3 — Carrier-Approved 38HQ Systems

INDOOR COMPR SECTION	OUTDOOR FAN COIL SECTION	INDOOR FAN COIL UNIT			MAX HEIGHT (ft)	
		Fan	Coil	Accu- Rate Piston No	Indoor Units	
					Above	Below
38HQ					Outdoor Fan Coil Unit	
127	940	40AQ030*		5	50	50
		—	28MQ030*†			
134	940	40AQ036		6		
		40FS160	28MQ036			
140	960	—	28MQ036†	7		
		40FS160	28MQ042			
146	960	—	28MQ042†	8		
		40FS200	28MQ048*			
		—	28MQ048*†			

*Indoor units that require replacement of AccuRater refrigerant control piston for optimum performance when used with specified 38HQ sections. Required piston is shown in table and is supplied with 38HQ compressor section for field installation.

†Used in systems with non-specified indoor air moving unit

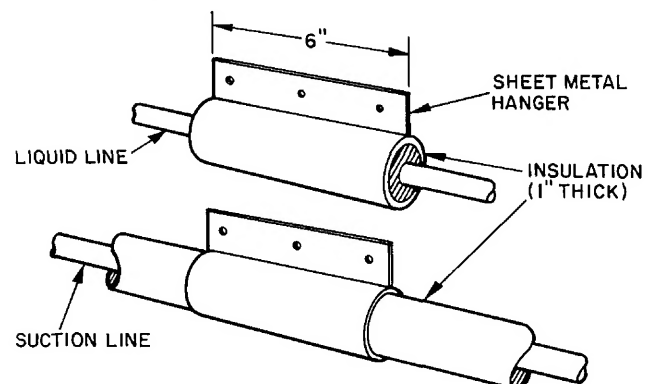


Fig. 3 — Refrigerant Line Hangers

- Construct round, 23-in. diameter pad a minimum of 6 in. above grade to provide clearance under holes for drainage and ice build-up. In areas where prolonged subfreezing temperatures or heavy snows occur: increase clearance from 12 to 18 in. by constructing an angle-iron frame to support unit 12 to 18 in. off concrete base. Cross angle of frame must not obstruct coil drainage holes. See Fig. 5 for recommended frame construction. Extend a 12-in. gravel apron around pad for condensate and defrost water drainage field.

Since it is lightweight, the outdoor unit can be mounted on a platform attached to or built out from structure. Construct platform using drainage and clearance recommendations above. Locate and construct platform to avoid possible transfer of unit vibration to structure.

ON THE ROOF: MOUNT OUTDOOR FAN COIL UNIT ON A LEVEL PLATFORM OR FRAME. Unit must be elevated for proper clearance as described under ground installation above. Roof design and water drainage must be planned to prevent units from setting in water. Flash all roof openings to prevent leaks.

Step 3 — Mount Indoor Compressor Section on a rigid, solid platform or concrete floor. Insert 1/4-in. asphalt impregnated felt pad (factory supplied) between unit base pan and mounting surface to provide full unit support and for vibration attenuation. (Do not use vibration isolator under corners of base pan.)

Step 4 — Make Piping Connections — The 38HQ units can be connected to indoor fan coil using Carrier accessory tubing package or field-supplied tubing of refrigerant grade. See Tables 1 and 2 (with notes) for unit piping connection type, size and line size recommendations and Table 4 for accessory tubing sizes. Maximum allowable system liquid line length is 100 feet. Maximum vapor line length from compressor section to indoor coil is 50 feet. Maximum vapor line length from compressor section to outdoor fan coil is 50 feet.

A capacity reduction will result if accessory tubing is used in 38HQ146 systems. For example, when a 25-ft, 7/8-in. accessory tubing package is used, there will be a capacity reduction of 1-1/2%. For maximum capacity, use 1-1/8 in. vapor line as recommended in Tables 1 and 2.

When other than 25 ft of interconnecting piping is used, follow special requirements described in Refrigerant Charging. Do not use less than 10 ft of liquid line. Do not cut accessory 7/8-in. vapor line. Bend or coil to fit.

Do not use damaged or contaminated tubing. Always evacuate or purge indoor coil, compressor section and tubing system (use field-supplied refrigerant, not unit refrigerant).

When making tubing connections, be sure to provide clearance at unit for electrical connections and follow tubing isolation method, page 2.

REPLACE THE ACCURATER™ REFRIGERANT CONTROL PISTON IN THE INDOOR COIL AS REQUIRED before connecting refrigerant lines. See Table 3. For piston replacement instructions, see AccuRater Servicing on page 13.

Table 4 — Accessories

PART NO.	DESCRIPTION						
38CQ900102	Six 38CQ900081 Low-voltage Honeywell Thermostat (HH07AT071) and Thermostat Subbase (HH93AZ073) with automatic changeover.						
38CQ900122	Six 38CQ900111 Low-voltage Honeywell Thermostat (HH07AT071) and Thermostat Subbase (HH93AZ075) with manual changeover						
38CQ900132	Six 38CQ900091 Liquid Line Filter-Drier						
38CQ900152	Six 38CQ900141 Solid State Time Guard (24 v)						
38CQ900172	Six HH22AG110 Optimizer Control						
38HQ900002	Six 38HQ900001 Outdoor Thermostat						
38RQ900012	Six 38RQ900001 Emergency Heat Relay						
38CQ900072	Six 38CQ900061 two-packs. Flare (3/8-in) to compatible (3/8-in) couplings						
38GS900392	Six 38GS900381 Start Capacitor and Relay for 38HQ127, 134						
TUBING							
TUBING PACKAGE	Length (ft)	Liquid		Suction*			COMPR SECTION
		O.D. (in.)	Tube End O.D. (in.)	O.D. (in.)	Tube End O.D. (in.)		
					Evap	Cond	
38GC900071	10	3/8	3/8	3/4	3/4	3/4	38HQ127, 38HQ134
38GC900081	18	3/8	3/8	3/4	3/4	3/4	
38GC900091	25	3/8	3/8	3/4	3/4	3/4	
38GC900101	35	3/8	3/8	3/4	3/4	3/4	
38GC900111	50	3/8	3/8	3/4	3/4	3/4	
38CQ900001	18	3/8	3/8	7/8†	3/4	3/4	38HQ140, 38HQ146
38CQ900011	25	3/8	3/8	7/8†	3/4	3/4	
38CQ900021	35	3/8	3/8	7/8†	3/4	3/4	
38CQ900031	50	3/8	3/8	7/8†	3/4	3/4	

*Suction line is insulated and has a 90° bend at one end

†Capacity reduction may occur when 7/8-in. accessory tubing is used on 38HQ146

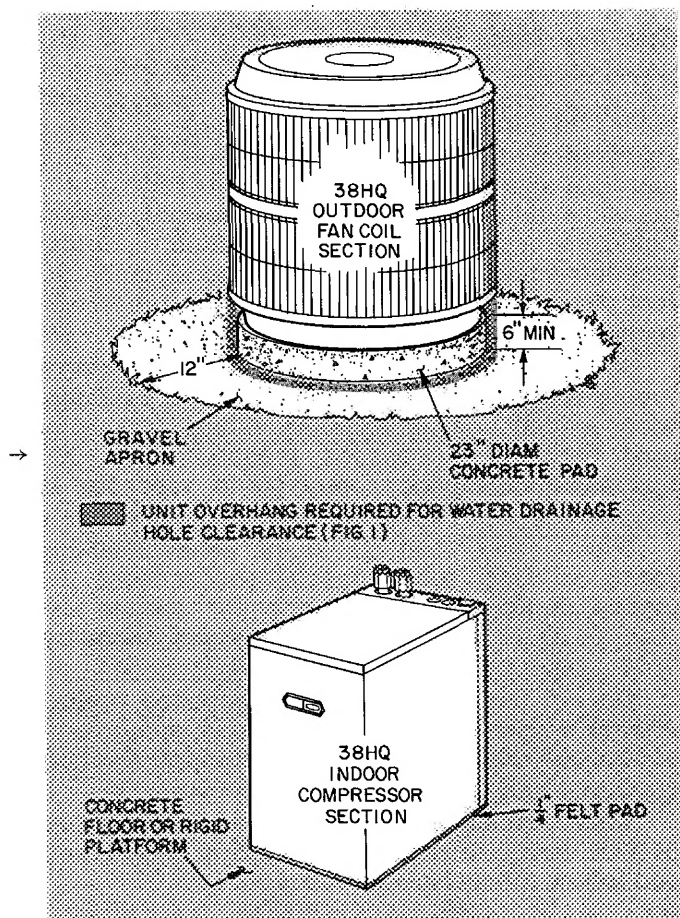


Fig. 4 – Concrete Pad Dimensions

CONNECT REFRIGERANT LINES to fittings on indoor and outdoor sections, Fig. 1, 2 and 6. Indoor compressor section has 2 compatible fitting vapor line connections. Outdoor and indoor fan coils have compatible fitting vapor line connection and liquid line flare connection.

Connect vapor line from outdoor fan coil to indoor compressor section, and from compressor section to indoor fan coil. Section vapor line as required (Fig. 6). Use correct compressor section vapor line connection to indoor and outdoor fan coils. Unit Compatible Fitting(s) permits mechanical or sweat connection as described below.

When using 1-1/8 in. field-supplied vapor line (38HQ146 Systems), remove vapor line adapters (4) shipped in compressor section. Sweat connect 1-1/8 in. end of adapter to each end of vapor lines. Connect 3/4-in. end of adapters to vapor line compatible fitting(s) on outdoor fan coil, indoor compressor section and indoor fan coil.

When a 7/8-in. field-supplied vapor line is used on 38HQ140, 4 field-supplied 3/4-in. to 7/8-in. vapor line adapters must be provided (not required → if 7/8-in. 38CQ accessory tubing is used).

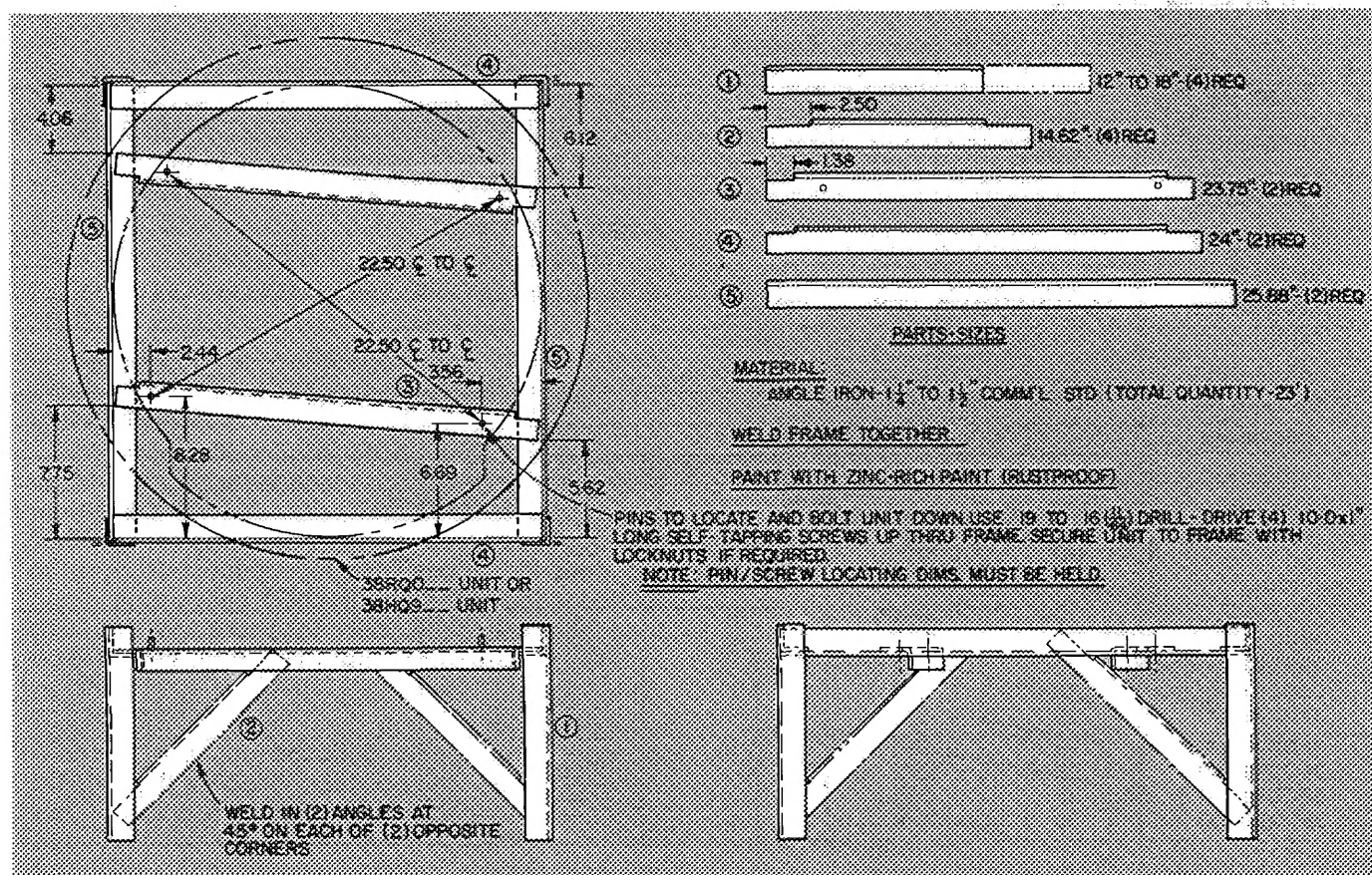


Fig. 5 – Outdoor Fan Coil Mounting Frame

Use a back-up wrench when making mechanical connections to compressor section to avoid twisting internal tubing to the reversing valve.

Mechanical Connection to Compatible Fitting (Mate one set of connections at a time.)

5. Tighten nut until it bottoms on back coupler flange. Keep tube bottomed in Compatible Fitting while tightening nut.

1. Remove locking nut, rubber O-ring and Schrader core from valve.
2. Cut tubing to correct length.
3. Insert tube into Compatible Fitting. Wrap top and bottom of service valves in wet cloth to prevent damage by heat. Solder with low temperature (450 F) silver alloy solder.
4. Replace Schrader core.
5. Evacuate or purge system with field-supplied refrigerant.

INDOOR FAN COIL

38HQ OUTDOOR FAN COIL SECTION

SEE ACCESSORY FLARE TO COMPATIBLE COUPLER, FIG-5

$\frac{1}{2}$ -IN FLARE CONNECTION

$\frac{1}{2}$ -IN COMPATIBLE FITTING CONNECTION

LIQUID LINE* (MAX LENGTH 100 FT)

VAPOR LINE* TO INDOOR COIL (MAX LENGTH 50 FT)

$\frac{1}{2}$ -IN COMPATIBLE FITTING CONNECTIONS

VAPOR LINE* TO OUTDOOR COIL (MAX LENGTH 50 FT)

ADAPTER LOCATIONS

NOTE: USE $\frac{3}{8}$ -TO- $\frac{1}{2}$ IN VAPOR LINE ADAPTERS (FACTORY SUPPLIED) FOR $\frac{1}{2}$ IN VAPOR LINE (FIELD SUPPLIED) RECOMMENDED ON 38HQ/46 SYSTEMS

38HQ INDOOR COMPRESSOR SECTION

*Standard accessory tubing package may be used. Vapor line must be sectioned at compressor section.

Fig. 6 – Refrigerant Piping Connections

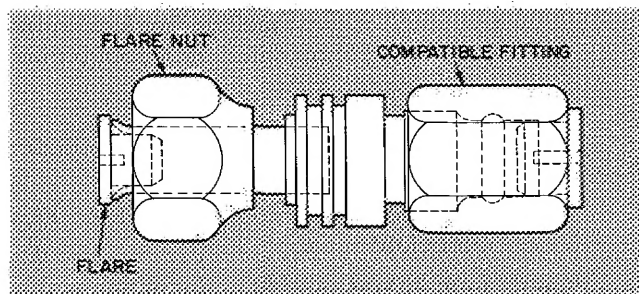


Fig. 7 — Accessory Coupler

Step 5 — Make Electrical Connections — Field wiring must comply with local and national fire, safety and electrical codes. Voltage to units must be within $\pm 10\%$ of voltage indicated on nameplate. Contact local power company for correction of improper line voltage.

Operation of units on improper line voltage constitutes abuse and is not covered by Carrier warranty.

When making electrical connections, provide clearance at unit for refrigerant piping connections. See Table 5 for recommended wire and fuse sizes.

Line and control power wiring for 38HQ outdoor fan coil are from connections in the 38HQ compressor section. Line power wire size to outdoor fan coil section must be 14 ga minimum when total wire length connecting compressor section to fan coil is under 25 feet. If over 25 ft, use same wire size as compressor section branch circuit.

INSTALL A BRANCH CIRCUIT FUSED DISCONNECT of adequate size to handle compressor section starting current. Provide a *separate disconnect switch* for outdoor fan coil section. Provide a separate *fused* disconnect for indoor fan coil unit and for each accessory electric heater circuit as required. (See Indoor Unit and Electric Heater Installation, Start-Up and Service Instructions.) Locate disconnect(s) within sight of and readily accessible from the unit, per section 440-14 of National Electrical Code (NEC).

BRING LINE POWER LEADS INTO COMPRESSOR SECTION — Extend leads from fused disconnect thru 1-1/8 in. hole provided in compressor section top panel (Fig. 2) and into control box. Extend line power leads for outdoor fan coil section thru 7/8-in. hole provided in compressor section top panel and into control box.

CONNECT GROUND LEADS AND POWER WIRING — Connect ground leads to the ground lug in control box for safety. Connect power wiring. See Fig. 8. Splice compressor section line power leads to yellow and black pigtails, and outdoor fan coil power leads to brown and blue pigtails. Use wire nuts and tape each connection.

CONNECT POWER LEADS FROM INDOOR COMPRESSOR SECTION TO OUTDOOR FAN COIL SECTION thru outdoor disconnect switch. From disconnect switch extend leads thru hole provided in fan coil base pan (Fig. 1) and into line voltage section of junction box, Fig. 18. Splice leads to black and blue pigtails with wire nuts.

SEE INDOOR FAN COIL UNIT AND ELECTRIC HEATER INSTALLATION, START-UP AND SERVICE INSTRUCTIONS for line power wiring details. All control wiring connections are shown in this booklet.

CONNECT CONTROL POWER WIRING (24 v) — Extend wiring thru 7/8-in. grommated hole in compressor section top panel (Fig. 2), and to control wiring terminal board on side of control box. Connect leads to terminal board as shown in Fig. 9. Extend and connect control wiring from compressor section to outdoor fan coil section as required. Make splice connections in low voltage section of fan coil junction box.

Use indoor fan coil unit transformer as 24-v supply for system. At least a 60-v-a transformer is recommended. Carrier approved indoor units are equipped with a 60-v-a transformer. See Indoor Unit data.

Use Carrier accessory indoor thermostat with subbase, Table 4.

Table 5 — Electrical Data (60-Hz)

INDOOR COMPR SECTION	OUTDOOR FAN COIL SECTION	V/PH	OPER VOLT*		COMPR		OFM (FLA)	BRANCH CIRCUIT							
								Power Wire Size (AWG)		Max Ft Wire		Gnd Wire Size (AWG)†		Max Fuse Amps**	
			Max	Min	LRA	RLA		ICS	OFC	ICS	OFC	ICS	OFC		
38HQ															
127	940	230/1	254	207	72	17.1	1.5	10	14†	50	25†	10	14†	40	
134	940				88	20	1.5	10	14†	43	25†	10	14†	45	
140	960				94	22.7	2.3	8	14†	58	25†	10	14†	50	
146	960				106	26.7	2.3	8	14†	50	25†	10	14†	60	

FLA — Full Load Amps
ICS — Indoor Compressor Section
LRA — Locked Rotor Amps
OFC — Outdoor Fan Coil
OFM — Outdoor Fan Motor
RLA — Rated Load Amps

*Permissible limits of the voltage range (for limited period of time) at which the units will operate satisfactorily

†Outdoor fan coil section wiring — For 25 ft wire run or less, use minimum 14 AWG size wire. For longer wire run use same size wire as supply to compressor section.

‡Required when using nonmetallic conduit.
**Maximum dual element fuse size

NOTES:

- All units have 24-v control circuit which requires external power source
- Copper wire size in table based on 60 C. Use copper or copper-clad aluminum wire to indoor section; copper wire only to outdoor section. Use latest National Electric Code for wire sizing.

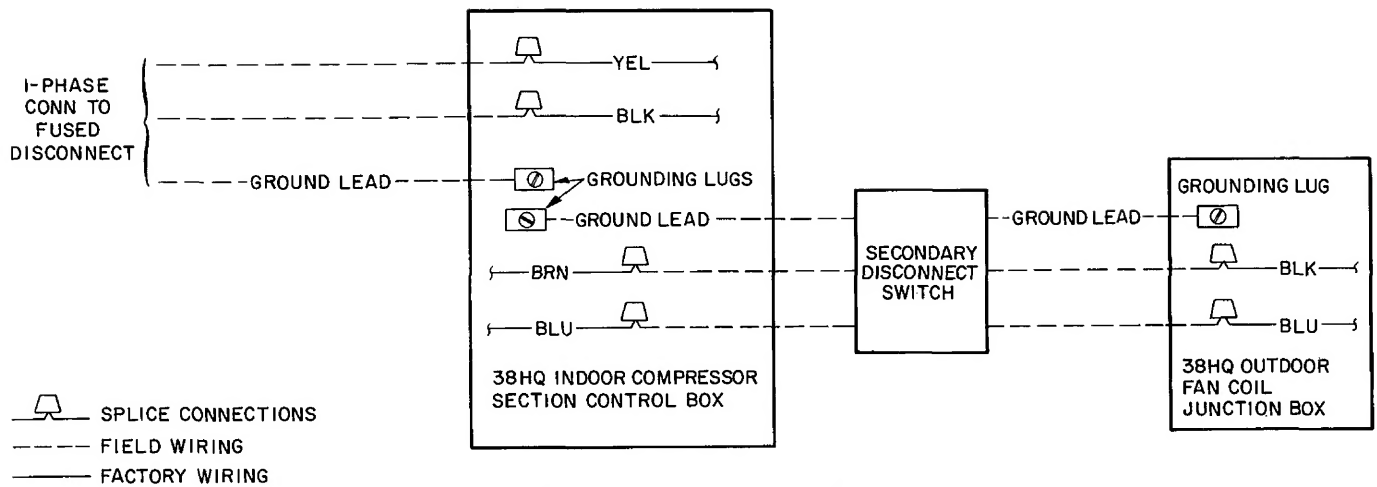


Fig. 8 – Line Power Connections

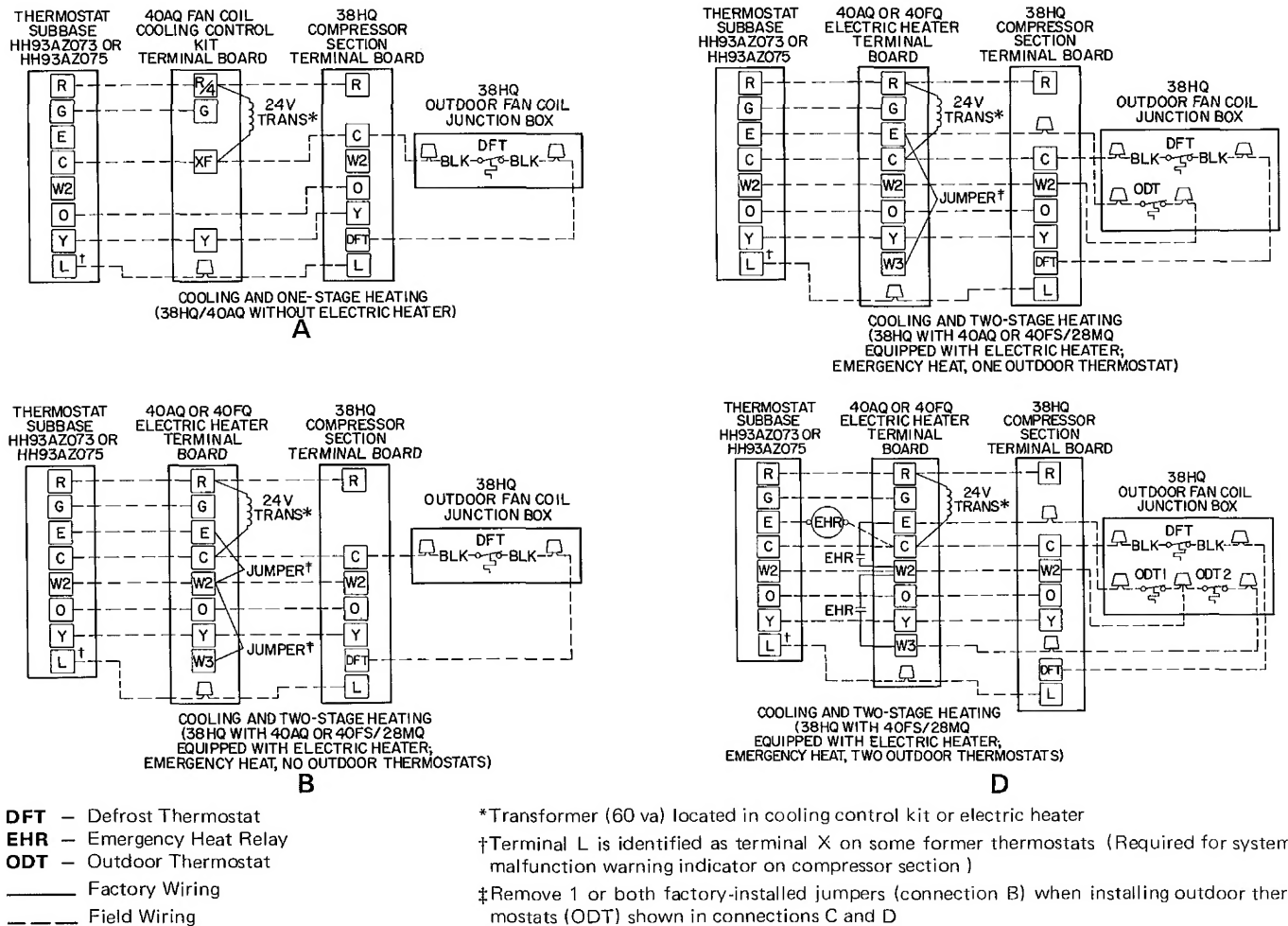


Fig. 9 – Control Circuit Connections

INITIAL START-UP

The 38HQ Indoor Section Compressor is equipped with a crankcase heater. It is recommended that heater be energized a minimum of 24 hours before starting unit. To energize heater only, turn the thermostat to OFF position and close electrical disconnect to heat pump.

Heat Anticipator Settings for Room Thermostat (HH07AT071) – Set anticipator settings for room thermostat according to Table 6. These settings may be changed slightly to provide a greater degree of comfort for a particular installation.

Accessory Outdoor Thermostat provides adjustable outdoor control of accessory electric heater (used on indoor fan coil). This thermostat makes contact when a drop in outdoor temperature occurs. It energizes a stage of electric heat when the outdoor temperature setting is reached, provided the room thermostat is on the second stage of heating. One outdoor thermostat is recommended for each stage of electric heat after the first stage. Set the outdoor thermostat(s) progressively lower for each stage. Refer to heat load of building and unit capacity to determine the correct outdoor thermostat settings.

The accessory emergency heat relay is required when 2 outdoor thermostats are used. It is automatically energized by the manually operated emergency heat switch in the indoor thermostat subbase. The thermostat locks out compressor and the relay bypasses the outdoor thermostats for electric heater operation during heat pump shut-down. When one outdoor thermostat is used, an emergency heat relay is not required. The emergency heat switch in the indoor thermostat subbase bypasses outdoor thermostat, locks out compressor and activates electric heater.

MOUNT OUTDOOR THERMOSTAT(S) – Locate maximum of 2 outdoor thermostats in control voltage section of outdoor fan coil unit junction box. Fasten in place with sheet metal screws.

MOUNT EMERGENCY HEAT RELAY in convenient location on indoor unit. Attach with sheet metal screw.

To Start System – (Be sure crankcase heater has been energized for 24 hours.) Adjust the thermostat as follows:

1. Set selector switch at OFF.
2. Turn on main disconnect switch(es) to indoor and outdoor units.
3. Set fan switch as desired (ON or AUTO.).
4. Set thermostat dial at desired temperature.
5. Set selector switch at HEAT or COOL.

Check system refrigerant charge. See Refrigerant Charging.

SERVICE

Refrigerant Charging – The 38HQ outdoor fan coil units contain correct operating charge for complete system (except 38HQ134/38HQ940 systems) when connected to 40FS/28MQ or 40AQ indoor units with 25 ft of tubing of recommended diameter. Charge adjustment is required on other systems. On 38HQ134/38HQ940 systems, add 14 oz of R-22 to factory charge, Table 7.

Adjust system charge for refrigerant line lengths and diameters that differ from 25 ft and 3/8-in. O.D. (liquid line), respectively, using refrigerant weights shown in table below. (Twenty-five feet of 3/8-in. O.D. tubing contains 14.4 oz of R-22.) Add R-22 charge to system if liquid line is over 25 ft; remove charge if liquid line is shorter than 25 feet.

LIQUID LINE DIAM (in.)	OUNCES OF R-22/FT LENGTH OF LIQUID LINE
3/8	58
5/16	36
1/4	21

When recharging is necessary during heating or cooling season, weigh in total charge indicated in Table 7. (Charge must be weighed in during heating season.) Remove any refrigerant remaining in system before recharging. If system has lost complete charge, evacuate system to 500 microns (29.7 in. vacuum) before recharging. Service port connections are provided on indoor compressor unit suction and discharge lines for evacuation and charging. (See Fig. 18 for service port location.) Dial-a-charge charging cylinder is an accurate de-

vice used to recharge systems by weight. These cylinders are available at refrigeration supply firms.

To check and/or adjust charge during cooling season, use correct Cooling Cycle Charging Chart (Fig. 10 thru 13) and follow Charging Chart Method below. The charging chart may also be used as an alternate method of recharging system.

To check *system operation* during heating cycle, use correct Heating Cycle Operation Check Chart (Fig. 14 thru 17). These charts indicate whether a correct relationship exists between system operating pressures and air temperatures entering indoor and outdoor units. If pressure and temperature lines do not intersect on chart, the system refrigerant charge may not be correct or other system abnormalities may exist. Do not use Operation Check Charts to adjust refrigerant charge. Weigh charge into system.

Table 6 – Thermostat Anticipator Settings

INDOOR COMPR SECTION	OUTDOOR FAN COIL SECTION	FIRST- STAGE ANTICI- PATOR SETTING	INDOOR UNIT WITH ELECTRIC HEATER	HTR KW	SECOND- STAGE ANTICI- PATOR SETTINGS
38HQ		Fixed	40AQ Fan-Coil with 40AQ Htrs or 40FS/28MQ with 40FQ Htrs	5.0	16
127	940			7.5	
134	940			10.0	
140	960			12.0	33
146	960			15.0	
				20.0	
				25.0	49
				30.0	

Table 7 – Service Data

INDOOR COMPR SECTION	38HQ127	38HQ134	38HQ140	38HQ146
REFRIG	R-22			
COMPR MODEL* (230-1-60)	MD2713HB	MD3413HB	PC4613HD	PC5313HD
Oil Rechg (oz)	46	46	76	76
OUTDOOR FAN COIL	38HQ940		38HQ960	
R-22 CHG (lb-oz)†	7 1 ‡		10 0	
REFRIG CONTROL	AccuRater™ (Bypass Type)			
AccuRater Piston No.	4		5	
FAN	Propeller – Direct Drive			
Cfm	3100		3600	
Rpm	1015		1080	
Diam (in.)	20		20	
Motor Hp	1/5		1/4	

*Refer to Service Parts catalog for replacement compressor model numbers.

†Factory-supplied charge in outdoor unit for complete system. Charge adjustment may be required on some systems. See Refrigerant Charging on page 8.

‡An additional 14 oz of R-22 is required on 38HQ134/38HQ940 systems.

COOLING CYCLE CHARGING CHART METHOD

1. Operate unit a minimum of 10 minutes before checking charge, and after each charge adjustment.
2. Measure suction pressure by attaching a gage to indoor unit suction service port. (See Fig. 18 for correct service port location.)
3. Measure outdoor (coil inlet) air dry-bulb temperature with service thermometer.

- Using a sling psychrometer, measure wet-bulb temperature of air entering indoor fan coil unit.
- Refer to correct Charging Chart. Locate on curves where outdoor air dry-bulb and indoor air wet-bulb temperature lines intersect.
- From intersect point, project vertically downward to chart suction pressure line. Compare chart suction pressure to unit suction pressure (Step 2).
- If unit suction pressure is lower than chart pressure, add refrigerant to system until chart pressure is reached. If unit suction pressure is higher than chart pressure, remove refrigerant until chart pressure is reached.

Unit Single-Phase Compressors that are Equipped with a Compressor Start Thermistor (PTC device) — When supply voltage is within 10% limit and compressor does not start, check the start thermistor with an ohmmeter.

CHECKING START THERMISTOR

- Shut off all power to unit and wait 10 minutes for thermistor to cool to indoor temperature.
- Measure resistance of thermistor with ohmmeter. Normal resistance readings are 25 to 50 ohms at 75 F ambient temperature.
- If ohmmeter resistance reading is 0 or much higher than 50 ohms, the thermistor is defective and must be replaced.

If start thermistor is good and compressor does not start, disconnect the thermistor from starting circuit and give compressor a temporary capacitance boost as described below. Run compressor for 10 minutes, then shut off and allow system pressure to equalize. Reconnect start thermistor and try restarting compressor without boost capacitor. If after 2 attempts the compressor does not start, remove thermistor and add an accessory start capacitor relay package.

Temporary Capacitance Boost — If necessary, see Carrier Standard Service Techniques Manual, Chapter 2, for details. Use a 130-mfd start capacitor. Connect wires with insulated probes to each capacitor terminal. Touch probes to each side of run capacitor or to compressor motor terminals R and S. Start compressor; *pull probes away after 3 seconds. Discharge start capacitor.*

Compressor Removal — See Table 7 for compressor information and Fig. 18 for component location. *Shut off power to unit.* Remove refrigerant from system using refrigerant removal methods described in Carrier Standard Service Techniques Manual, Chapter 1.

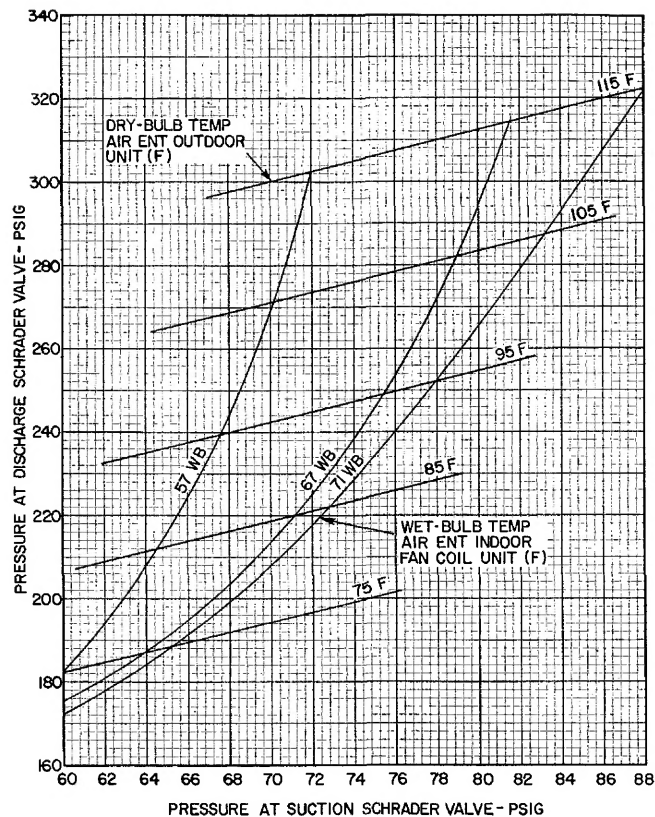


Fig. 10 — 38HQ127/38HQ940 with 40AQ030 Cooling Cycle Charging Chart (R-22)

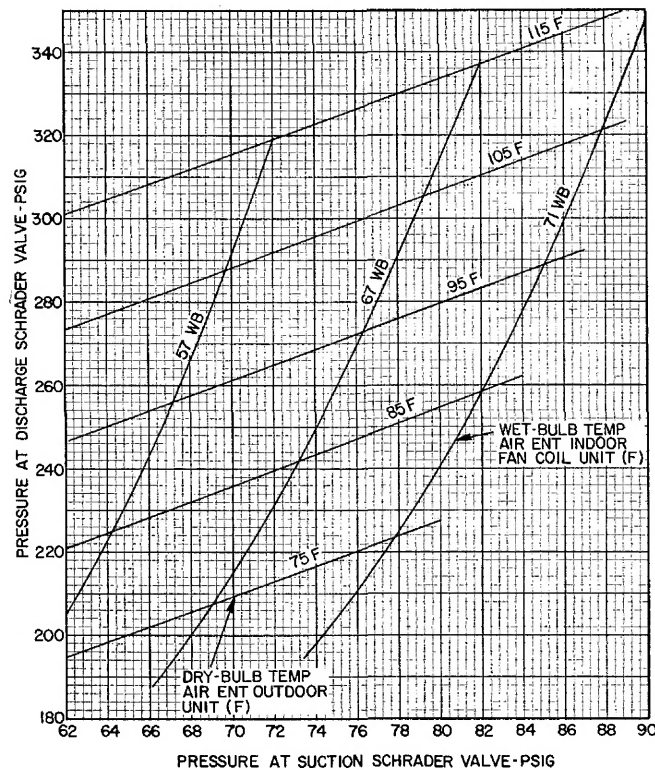


Fig. 11 — 38HQ134/38HQ940 with 40AQ036 or 40FS160/28MQ036 Cooling Cycle Charging Chart

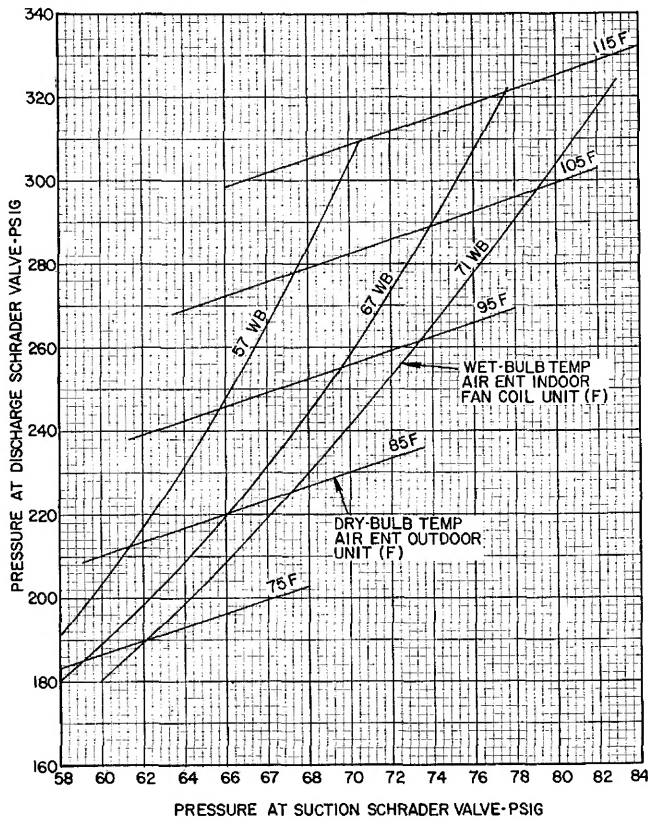


Fig. 12 – 38HQ140/38HQ960 with 40FS160/28MQ042 Cooling Cycle Charging Chart

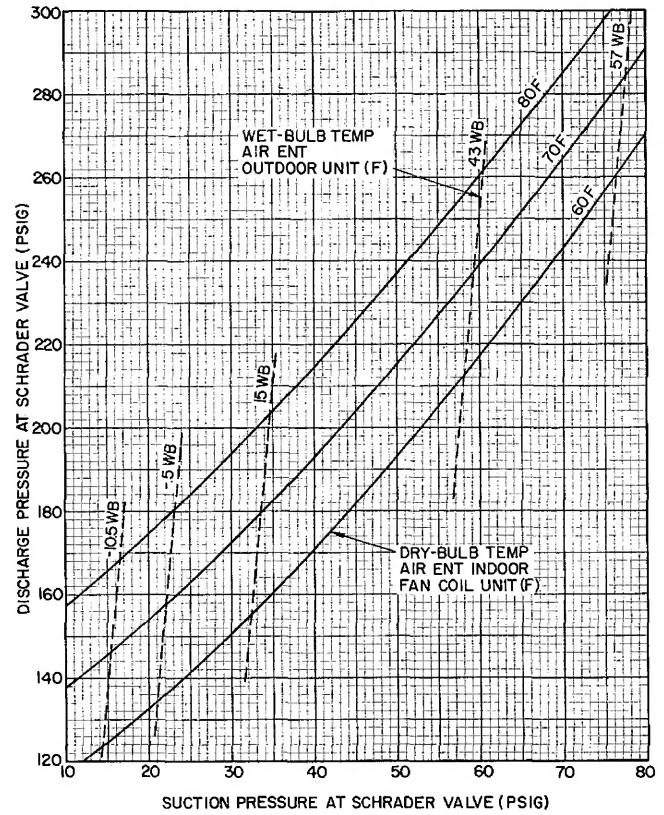


Fig. 14 – 38HQ127/38HQ940 with 40AQ030 Heating Cycle Operation Check Chart

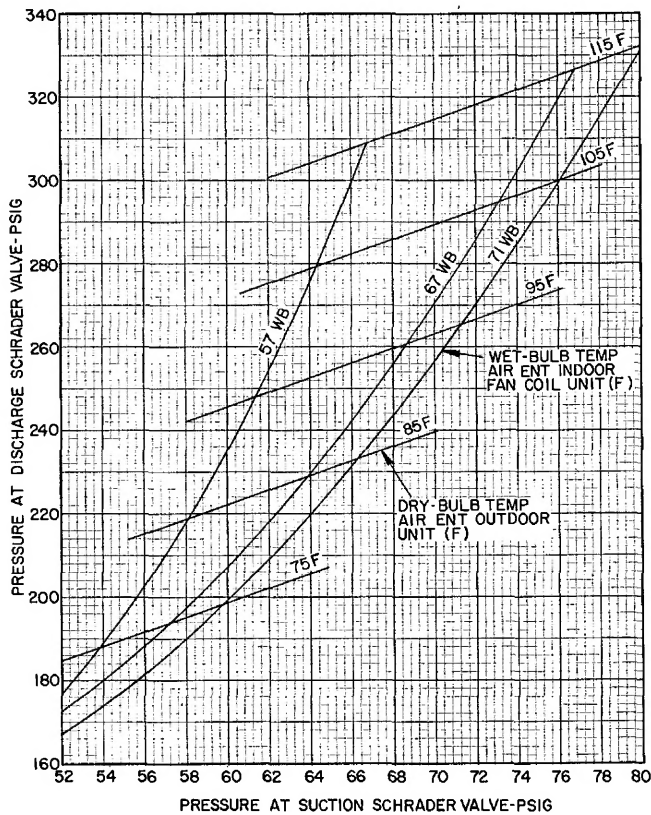


Fig. 13 – 38HQ146/38HQ960 with 40FS200/28MQ048 Cooling Cycle Charging Chart

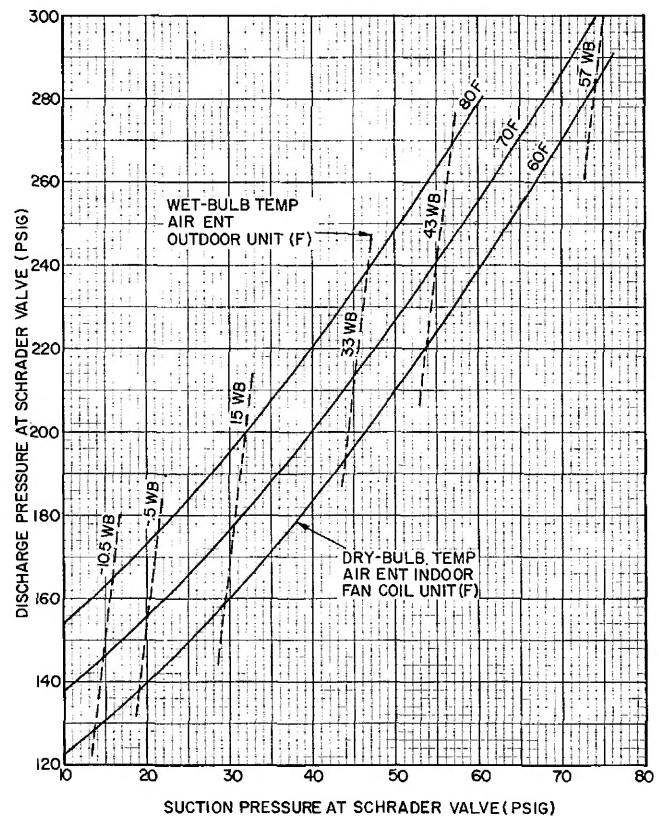
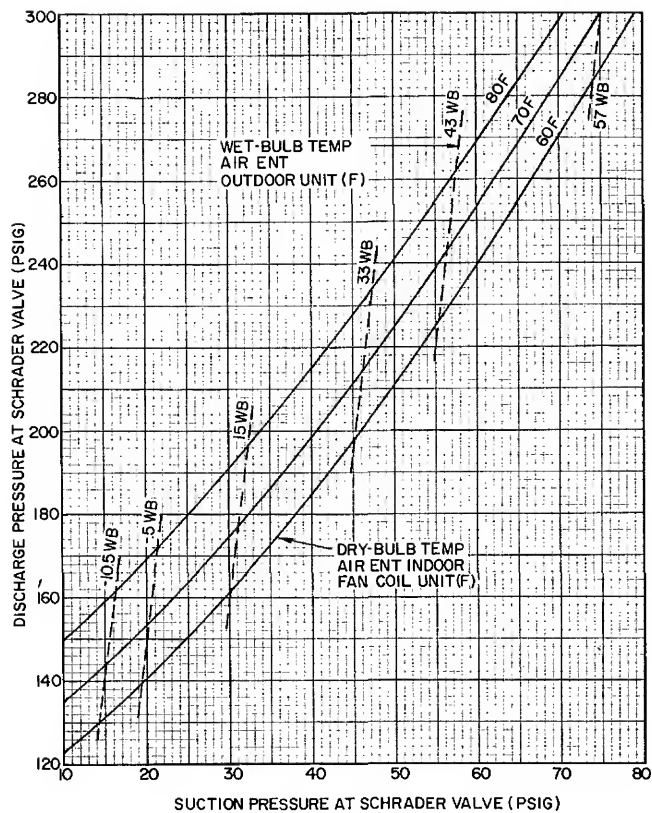
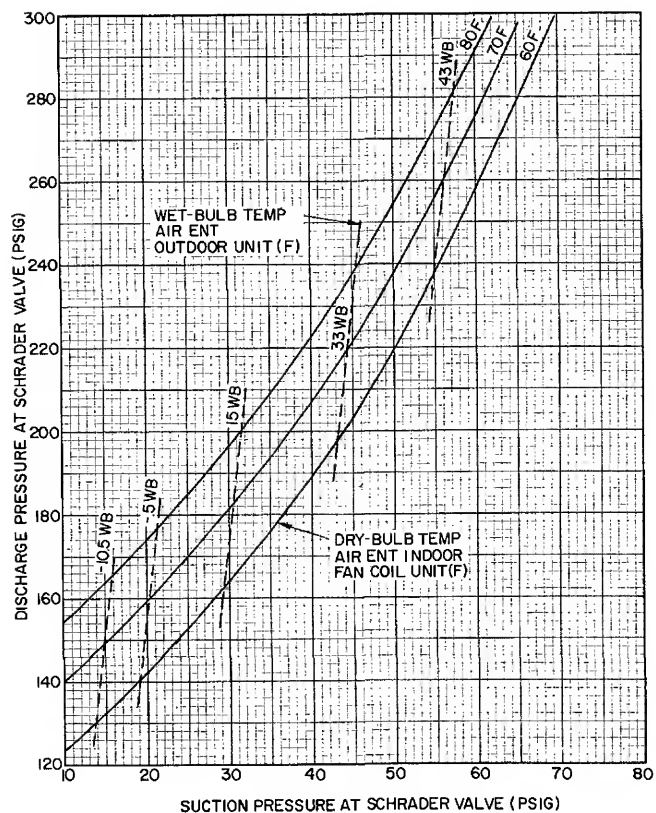


Fig. 15 – 38HQ134/38HQ940 with 40AQ036 or 40FS160/28MQ036 Heating Cycle Operation Check Chart



**Fig. 16 – 38HQ140/38HQ960 with
40FS160/28MQ042 Heating Cycle Operation
Check Chart**



**Fig. 17 – 38HQ146/38HQ960 with
40FS200/28MQ048 Heating Cycle Operation
Check Chart**

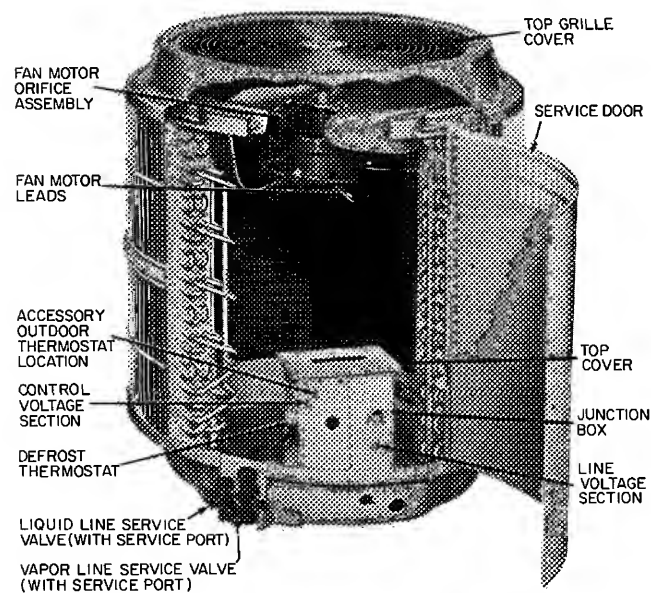
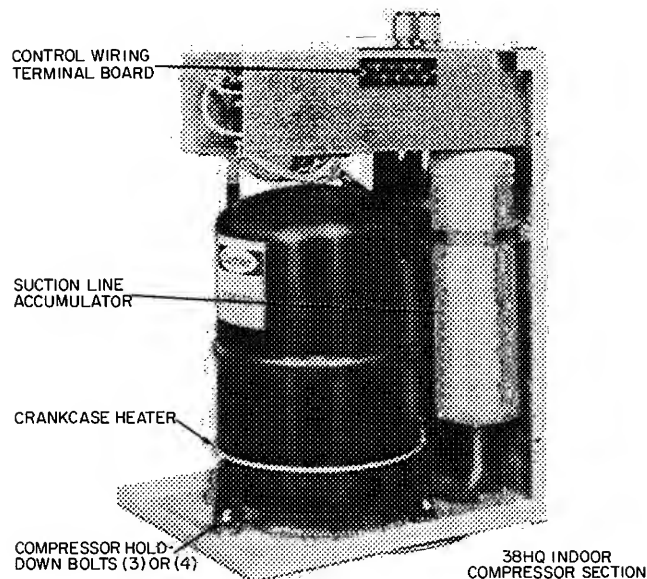
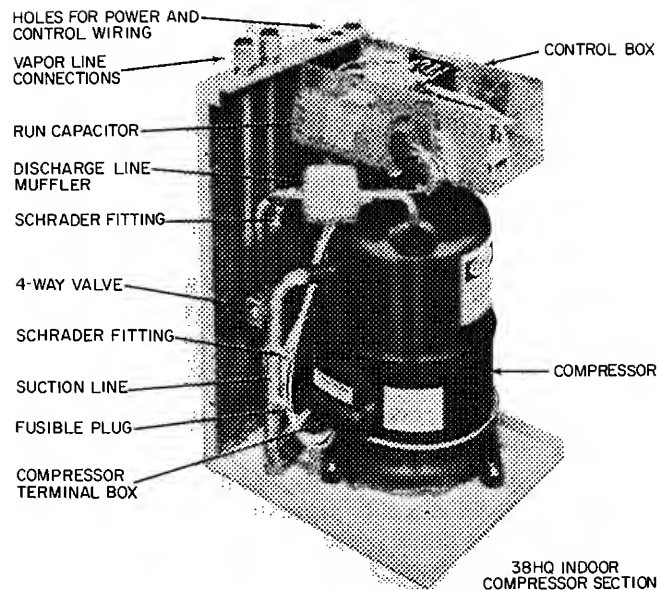


Fig. 18 – Component Location

Follow safety codes, and wear safety glasses and work gloves. Have quenching cloth available.

1. Remove unit top cover and front access wrapper.
2. Remove compressor terminal box cover, disconnect and remove compressor power leads.
3. Using a tubing cutter, cut suction and discharge lines at convenient place near compressor for easy reassembly to new compressor with copper slip couplings.
4. Remove crankcase heater from compressor base.
5. Remove compressor hold-down bolts. Lift out compressor.
6. Carefully unbrazed suction and discharge line piping stubs from compressor. If oil vapor in piping stubs ignites, use quenching cloth.

CAUTION: Muffler may contain quantity of oil.

7. Braze piping stubs (removed in step 6) on new compressor.
8. Clean system. Add new liquid line heat pump filter-drier as described below.
9. Install new compressor in unit. Braze suction and discharge lines to compressor piping stubs (at points where cut, step 3) using field-supplied copper couplings. Ensure compressor hold-down bolts are in place. Connect wiring.
10. Evacuate and recharge system.

FILTER-DRIER – Install *accessory* heat pump filter-drier (Table 4) in system liquid line when refrigerant system is opened for service as described under Compressor Removal. Position drier in liquid line at convenient location.

Unit Controls and Safety Devices

HIGH-PRESSURE RELIEF VALVE is located in compressor. Relief valve opens at a pressure differential of approximately 600 psi between suction (low side) and discharge (high side) to allow pressure equalization.

INTERNAL CURRENT AND TEMPERATURE SENSITIVE OVERLOAD resets automatically when internal compressor motor temperature drops to a safe level (overloads may require up to 45 minutes to reset). When an internal overload is suspected of being open, check by using an ohmmeter or continuity tester. If necessary, refer to Carrier Standard Service Techniques Manual, Chapter 2, for complete instructions.

LOW PRESSURE SWITCH is located in compressor section on suction line between 4-way valve and accumulator. Provides loss of charge protection by shutting compressor off if suction pressure

drops below setting. Low pressure switch settings are: open, 5 ± 3 psig; close, 20 ± 5 psig.

CRANKCASE HEATER is connected across line side of contactor and operates continuously.

The purpose of the heater is to keep the crankcase warm during the off cycle and thus prevent dilution of the oil with refrigerant. This assures good lubrication and prevents loss of oil from crankcase during start-up.

If the electrical disconnect switch to the compressor section has been off for an extended period of time, the crankcase heater should be energized for 24 hours before starting the compressor.

SYSTEM MALFUNCTION WARNING INDICATOR turns on indoor thermostat light if thermostat calls for heating or cooling and compressor doesn't operate because: low pressure switch or internal line break has functioned; control device or compressor is not operational. The light turns off when compressor restarts, indoor thermostat is satisfied or if thermostat is manually turned off, then on.

DEFROST CONTROL, consisting of a defrost timer, defrost thermostat and defrost relay, interrupts normal system heating operation every 90 minutes to defrost outdoor coil, *if the coil saturated suction temperature indicates freezing temperatures*. Defrost control simultaneously stops outdoor fan, energizes reversing valve solenoid to return system to cooling cycle (outdoor fan coil unit as condenser, indoor fan coil unit as evaporator), and activates accessory electric heater.

For the heat pump to defrost, 2 conditions are necessary:

1. Defrost timer contacts must be closed.
2. Refrigerant temperature from outdoor unit must be cold enough to cause defrost thermostat contacts to close. Contacts close at $27 (\pm 4)$ F.

Every 90 minutes of elapsed running time, the defrost timer contacts close for 10 seconds. If the defrost thermostat contacts are closed, the unit defrosts. The defrost timer limits defrosting period to 10 minutes. Normally the frost is removed and the defrost thermostat contacts will open to terminate defrosting before 10 minutes have elapsed. Defrost thermostat contacts open at $80 (\pm 6)$ F liquid refrigerant temperature. When defrosting is terminated, the outdoor fan motor is energized and reversing valve solenoid is de-energized returning unit to heating cycle.

HEAT PUMP CIRCUITS shown in Fig. 20 are refrigerant flow diagrams for heating and cooling cycles.

Pumpdown Procedure (Cooling Cycle) — The 38HQ units may be pumped down in order to make repairs on low side of system without losing complete refrigerant charge.

1. Attach pressure gage to suction service port.
2. Frontseat the liquid line valve on outdoor fan coil.
3. Start unit and run until suction pressure reaches 5 psig (see Caution) or low pressure switch opens.
4. Shut unit off and frontseat vapor line valve on outdoor fan coil unit.
5. Vent remaining pressure.

CAUTION: 38HQ unit coils hold only factory-supplied amount (plus 14 oz. on 38HQ134/38HQ940) of refrigerant. Additional refrigerant may cause units to relieve pressure thru internal pressure relief valve (indicated by a sudden rise of suction pressure) before suction pressure reaches 5 psig or low pressure switch opens. If this occurs, shut off unit immediately; frontseat vapor valve and vent remaining pressure.

AccuRater™ (Bypass Type) Servicing — See Fig. 19 for bypass type AccuRater components. The piston has a refrigerant metering hole thru it. The retainer forms a stop for the piston in the refrigerant bypass mode, and a sealing surface for liquid line flare connection. To check, clean or replace piston:

1. Shut off power to unit.
2. Pump unit down using Pumpdown Procedure described previously.
3. Remove liquid line flare connection from AccuRater.
4. Pull retainer out of body being careful not to scratch flare sealing surface. If retainer does not pull out easily, carefully use vise grips to remove retainer.
5. Slide piston out by inserting a small soft wire thru metering hole (18-gage thermostat wire). See that metering hole, sealing surface around piston cones and fluted portion of piston are not damaged.
6. Clean piston refrigerant metering hole.
7. Replace container O-ring before reassembling bypass type AccuRater. Carrier O-ring part no. is 99CC501052.

LIQUID LINE STRAINER (protects AccuRater) made of wire mesh is located in the liquid line inside 38HQ fan coil unit behind liquid line service valve (Fig. 19). Liquid line is belled and sweat connected where strainer is located. If strainer is plugged, unsweat belled liquid line connection and replace strainer.

MAINTENANCE

CAUTION: Before performing recommended maintenance, be sure main power switch to unit is turned off.

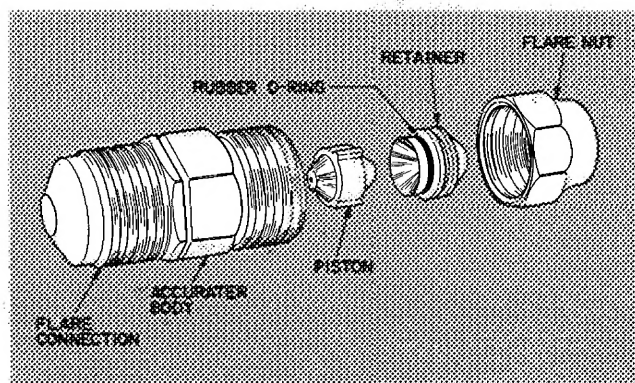


Fig. 19 — AccuRater (Bypass Type) Components

Lubrication

COMPRESSOR contains factory oil charge. Replace oil when lost. See Table 7 for oil recharge. If necessary, refer to Carrier Standard Service Techniques Manual, Chapter 1, page 1-21, for oil recharging procedure. Use Carrier PP33-1, Texaco Capella B or Suniso 3G oil.

OUTDOOR FAN MOTOR BEARINGS are pre-lubricated for 3 years heavy duty or 5 years normal duty. When lubrication is necessary, send motor to authorized motor repair shop.

Outdoor Coil Cleaning — *Ensure power to unit is shut off.* Clean the outdoor unit coil with water at the beginning of every cooling season or more often if required. Use ordinary garden hose at a pressure high enough to clean efficiently. For best results, unscrew and remove unit top cover (grille).

Insert hose nozzle between fan blades and spray coil fins from inside-to-outside the unit. If unit has a double-row coil, loosen screws to separate coils, pull outer row of coils away from inner row, and flush dirt toward outside of both coils. Flush dirt from base pan by spraying water thru top of unit. Avoid splashing mud on coil or water on the fan motor. Make sure that water drainage holes under outdoor coil are not obstructed.

Outdoor Fan Position — Required fan position is shown in Fig. 21. Adjust fan by loosening setscrews and moving fan blades up or down.

FAN MOTOR REMOVAL

1. Shut off power to outdoor fan coil unit.
2. Remove unit top cover (grille). Open or remove service door. Remove junction box cover.
3. Disconnect fan motor leads in line-voltage section of junction box. See Fig. 18.
4. Remove fan from motor shaft by loosening setscrews and pulling upward on fan hub.
5. Remove bolt holding fan motor to motor mounting bracket. Remove motor with wiring thru top of unit.

To replace motor: place motor on self-positioning motor mounting bracket and retighten bolt.

Before replacing metal fan, be sure rain shield (Fig. 21) is in place on motor shaft.

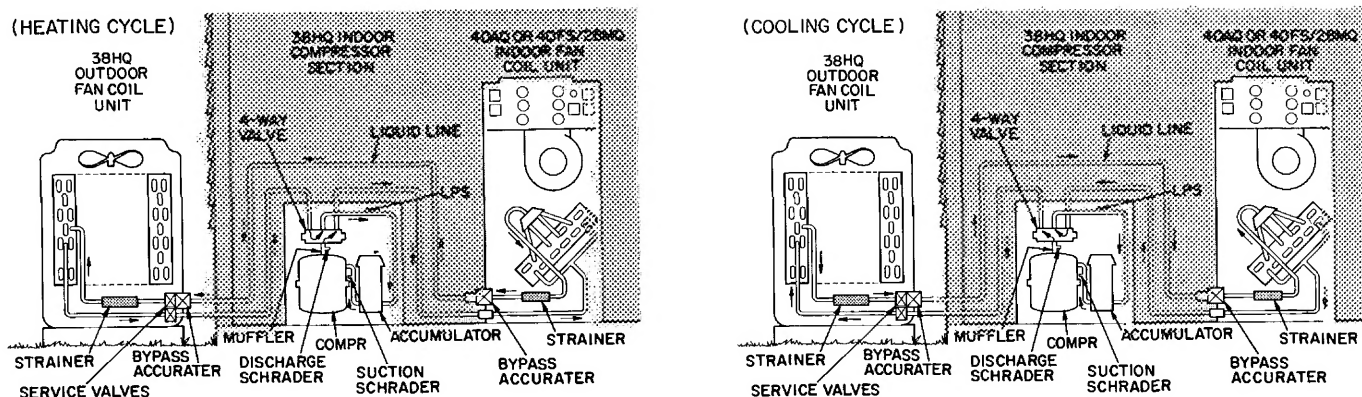


Fig. 20 – 38HQ Refrigerant Flow Diagrams

Compatible Fitting Repair

LEAKING MECHANICAL CONNECTION – Frontseat outdoor section service valves and relieve refrigerant pressure in tubing and compressor section. Back locknut off Carrier Compatible Fitting onto tube. Cut fitting between threads and seal ring bead shown in Fig. 22. Remove tubing section remaining in threaded portion of fitting. Discard locknut.

Clean, flux, and insert new tube end into remaining portion of Carrier Compatible Fitting.

Wrap valve base (outdoor unit) in wet rag. Heat and apply low-temperature solder (450 F).

LEAKING SWEAT CONNECTION – Frontseat service valves and relieve refrigerant pressure in tubing. Clean and flux area around leak and apply low-temperature solder (450 F).

Evacuate or purge indoor fan coil, compressor section and tubing system. Add refrigerant charge (see charging instructions).

LEAKING FLARE CONNECTION – Cut and reflare 3/8-in. system liquid line.

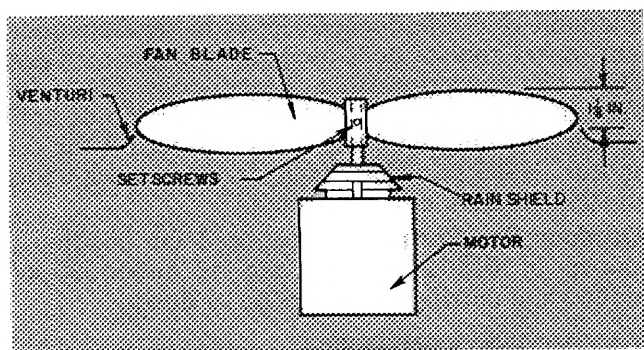


Fig. 21 – Condenser Fan Position

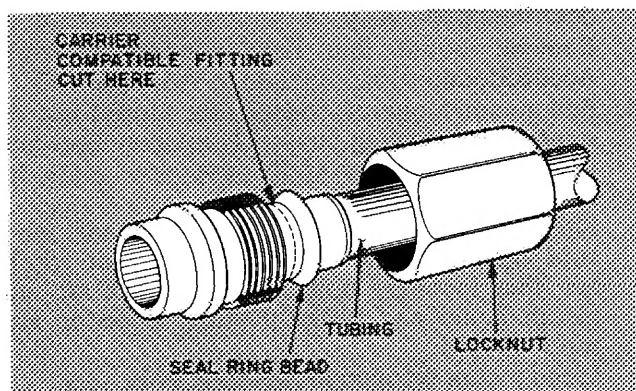
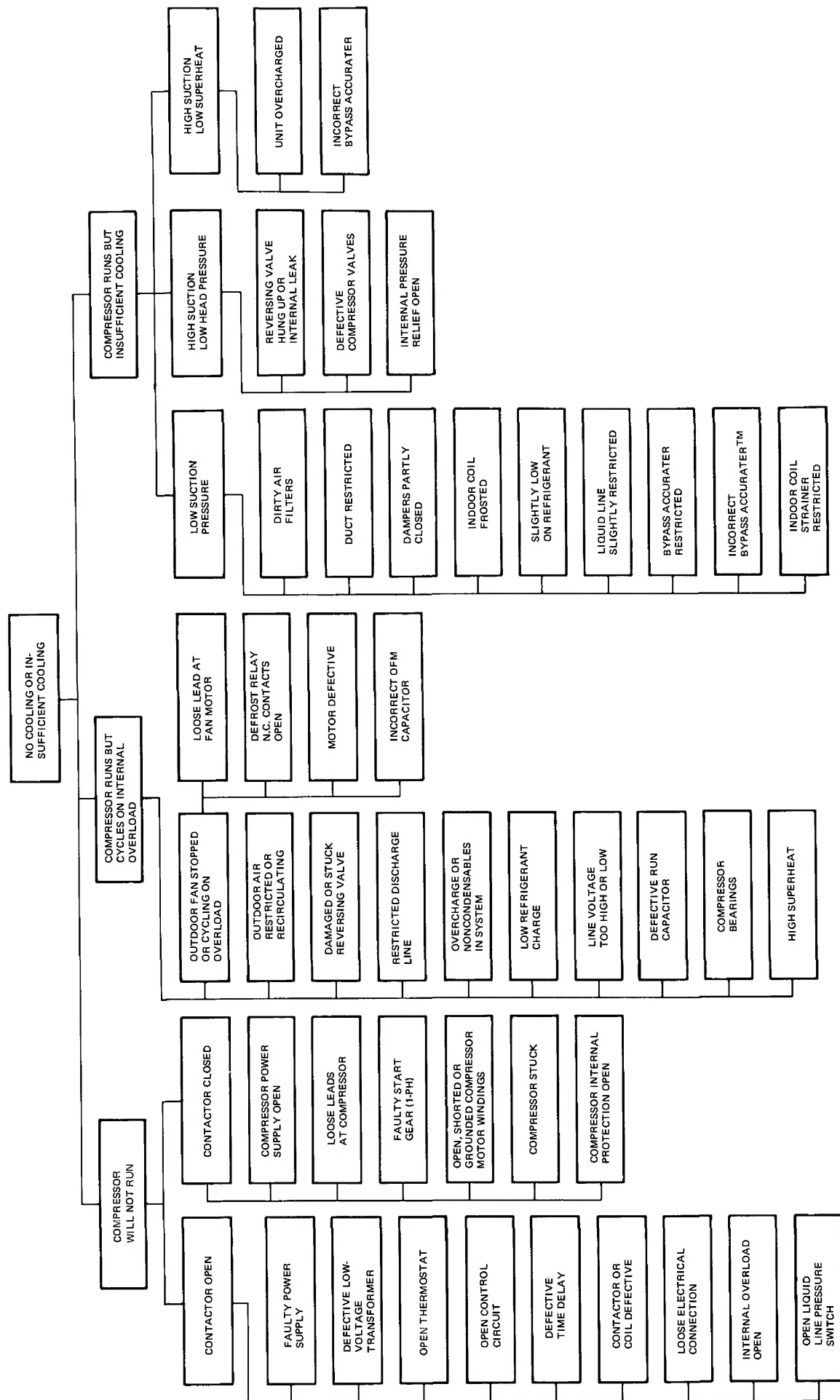
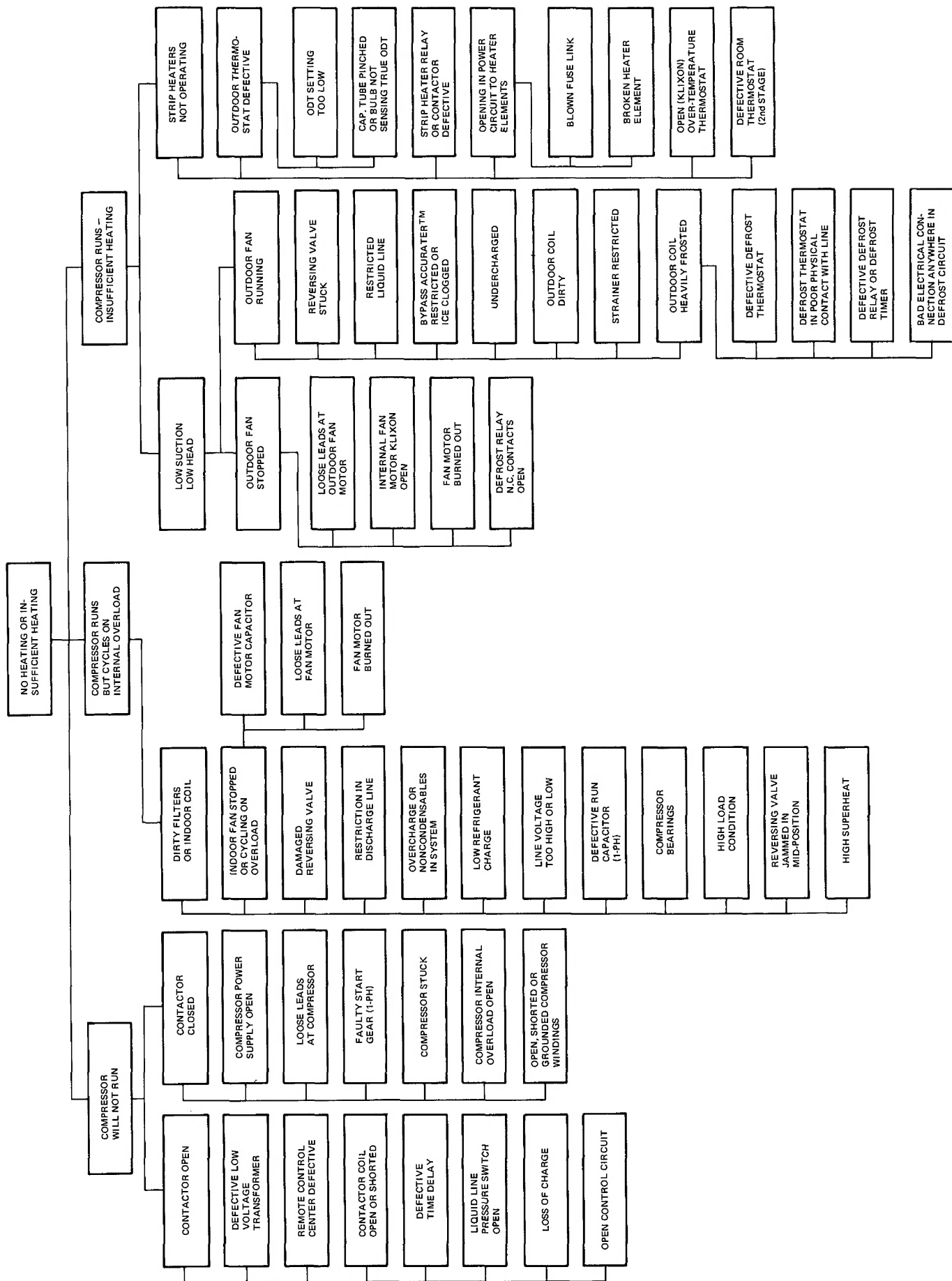


Fig. 22 – Carrier Compatible Fitting

TROUBLESHOOTING CHART – COOLING CYCLE



TROUBLESHOOTING CHART — HEATING CYCLE



For replacement items use Carrier Specified Parts.

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

Tab 12

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